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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,813	12/21/2001	Humphrey H. Hardy	CON-1021 (ICR-9530.0-00)	5299
7590 08/09/2005 CHERYL S RATCLIFFE CONOCO INC POST OFFICE BOX 4783 HOUSTON, TX 77210-4783			EXAMINER FERRIS III, FRED O	
			ART UNIT 2128	PAPER NUMBER

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/036,813

Applicant(s)

HARDY ET AL.

Examiner

Fred Ferris

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/16, 3/28.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. *Claims 1-32 have been presented for examination based on applicant's disclosure filed 21 December 2001. Claims 1-32 have been rejected by the examiner.*

Drawings

2. *Applicant's drawings submitted on 7 January 2003 have been approved by the examiner.*

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. *Claims 1, 18, and 29 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 11 of copending Application No. 09/949,966. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of claims 1 and 11 in Application No. 09/949,966 are drawn to modeling faulting in a subsurface*

formation by defining interconnected nodes including material properties, specifying a deformation pattern, and using DRRA to find a force equilibrium solution as are claims 1, 18, and 29 of the present invention. Further, the claimed "selecting" a mode of definition of a subsurface model and would obviously be the same as "defining" the subsurface model and would naturally include "regions" within cross sectional planes as recited in claims 1 and 11 of Application No. 09/949,966. Also, the claimed nodes interconnected by "linkages" of the present invention appear to perform an equivalent function to the "rods" connecting the nodes recited in claims 1 and 11 of Application No. 09/949,966 from a modeling perspective.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-32 are rejected under 35 U.S.C. 101 because the claimed invention is drawn to non-statutory subject matter.

Per independent claims 1, 18 and 29: The Examiner submits that method of claims 1, 18, and 29, as written, are merely drawn to a mental process for modeling borehole failure by defining subsurface regions of interconnected nodes associated material properties since the language of the claims can be interpreted as meaning the

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method is carried out by a mental process augmented (calculated) using pencil and paper. (i.e. not a machine or computer process) See Figure

MPEP 2111 [R-1] recites the following:

**"2111 [R-1] Claim Interpretation; Broadest Reasonable Interpretation
CLAIMS MUST BE GIVEN THEIR BROADEST REASONABLE
INTERPRETATION**

During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000).< Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969) (Claim 9 was directed to a process of analyzing data generated by mass spectrographic analysis of a gas. The process comprised selecting the data to be analyzed by subjecting the data to a mathematical manipulation. The examiner made rejections under 35 U.S.C. 101 and 102. In the 35 U.S.C. 102 rejection, the examiner explained that the claim was anticipated by a mental process augmented by pencil and paper markings. The court agreed that the claim was not limited to using a machine to carry out the process since the claim did not explicitly set forth the machine. The court explained that "reading a claim in light of the specification, to thereby interpret limitations explicitly recited in the claim, is a quite different thing from reading limitations of the specification into a claim," to thereby narrow the scope of the claim by implicitly adding disclosed limitations which have no express basis in the claim." The court found that applicant was advocating the latter, i.e., the impermissible importation of subject matter from the specification into the claim.). See also In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (The court held that the PTO is not required, in the course of prosecution, to interpret claims in applications in the same manner as a court would interpret claims in an infringement suit. Rather, the "PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification.")"

The Examiner further submits that, in view of the language of the claims, Applicant's have merely claimed a manipulation of abstract ideas by a mental process and have not specifically set forth a machine or computer process for performing the actual modeling of the borehole failure. Dependent claims 2-17, 19-28, and 30-32 inherit the defects of the claims from which they depend.

Preamble of the Claims

5. *The preambles of independent claims 1, 18, and 29 as presented for examination, have not been given patentable weight. Appropriate weight is given to limitations recited in the body of the claim that are needed for purpose of antecedence. "A mere statement of purpose or intended use in the preamble of a claim need not be considered in finding anticipation; however, it must be considered if the language of a preamble is necessary to give meaning to the claim" Diversitech Corp. v. Century Steps, Inc., 7 USPQ2d 1315 (Fed. Cir. 1988); In re Stencel, 4 USPQ2d 1071 (Fed. Cir. 1987)*

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. ***Claims 1-6, 10-12, 16-26, and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Predictive modeling of naturally fractured reservoirs***

using geomechanics and flow simulation", Bourne et al, International Petroleum Exhibition and Conference, SPE 87253, Copyright 2000 SPE in view of U.S. Patent 6,078,867 issued to Plumb et al and in further view of applicants admission that using DRRA to find a force equilibrium is prior art.

Independent claim 1 is drawn to:

modeling failure of a borehole in a subsurface formation by:

- defining subsurface model including regions and borehole and (one) additional region from:*
 - a liner in the borehole*
 - a casing in the borehole*
 - earth formation*
- regions comprising nodes interconnected by linkages,*
- defining material properties (statistical variation) associated with nodes and linkages of subsurface model*
- specifying initial deformation patten of the model*
- using dynamic range relaxation algorithm DRRA to find force equilibrium solution for subsurface model and initial deformation pattern and deformed model with fracturing.*

Regarding independent claims 1, 18, and 29: Bourne teaches techniques for modeling and predicting fracturing (failures) in a subsurface formation (page 5, para: 2-4), defining a subsurface model of regions (page 2, 8-9, Section 4) that includes defining material properties (abstract, page 2, para: 2, Sections 3, 4, Fig. 1) that are associated with a simulator grid (consisting of nodes, uses MoRes and MaficOil simulators, Sections 3-4, Figs. 4-9), and defining a deformation pattern (Intro, Section 2) as part of the simulation model.

Bourne does not explicitly disclose regions including a borehole with liner or casing. (although the examiner believes these would be standard features included in the MoRes and MaficOil simulators)

Plumb teaches a borehole mesh model consisting of interconnecting nodes used in modeling analysis of borehole failure (Background, Figs. 2, 4). The examiner also notes, that a skilled artisan would have known to include a borehole with liner or casing as part of the borehole mesh model in order to accurately model borehole failure in a real world borehole application. U.S. Patent 6,069,118 issued to Hinkel et al, for example, discloses a borehole including a liner and casing as would be known to one of ordinary skill in the art. (See: Fig. 4b)

It would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the teachings of Bourne relating to modeling and predicting fracturing (failures) in a subsurface formation by defining a subsurface model of regions, with the teachings of Plumb relating to a borehole mesh model consisting of interconnecting nodes, to realize the elements of the claimed invention. An obvious motivation exists since, in this case, the Bourne reference teaches to the Plumb reference, and the Plumb reference teaches to the Bourne reference. Specifically, both Bourne and Plumb teach borehole modeling and predicting failures in a subsurface formation and both are used in the same technological arena as noted above. Bourne teaches to Plumb because Bourne teaches predicting fracturing (failures) in a subsurface formation of subsurface model of regions that includes boreholes, (See: Bourne, Abstract). Plumb teaches to Bourne because Plumb specifically teaches modeling the actual borehole for the purpose of failure analysis. (See: Plumb: Background, Figs. 2, 4) Further, the level of skill required by an artisan to realize the claimed limitations of the present invention is clearly established by both references.

(See: Bourne/Plumb, Abstract) Accordingly, a skilled artisan tasked with realizing a method for borehole modeling and predicting failures in a subsurface formation, and having access to the teachings of Bourne and Plumb, would have knowingly modified the teachings of Bourne with the teachings of Plumb (or visa versa) to realize the claimed elements of the present invention while reducing the cost and development time.

Bourne further does not explicitly disclose the use of DRRA in finding a force equilibrium solution.

Applicants have admitted that the use of DRRA is prior art, and hence skilled artisan would have knowingly further modified teachings Bourne and Plumb using the motivational reasoning cited above since DRRA was known at the time of the invention (see: specification page 9, line 11, Fig. 2).

Per dependent claims 2-3, 22-23, 30-32: Bourne teaches multiple grid arrangements and modeling the elasticity properties (i.e. spring elasticity, rod, etc.) of the subsurface formation (Sections 2-4, Figs. 1, 4,6, 8-10) and parameter inputs via a GUI interface.

Per dependent claims 4-6, 24-26: These claimed features merely relate to defining the forces acting on the subsurface model grid and are taught by Bourne as cited above (See: Sections 2, 3).

Per dependent claims 10-12, 16-17: The multiple grid arrangements and modeling the elasticity properties disclosed by Bourne would obviously include node linkage between grid elements. Bourne also discloses fluid flowing and deformation in

an earth formation model (page 2, para: 1, 10). Plumb teaches linear borehole model in an earth formation as noted above (Figs. 2, 4) and would have knowingly been incorporated by a skilled artisan using the reasoning cited above.

Per dependent claim 19-21: The limitations of this claim are rendered obvious by the combination of Bourne and Plumb since Bourne teaches geologic deformation (page 2, para: 1) and force and stress distributions (Sections 2, 3) while Plumb discloses defining a borehole trajectory, node removal, and analyzing and identifying failures (Background, Figs. 2, 4).

Allowable Subject Matter

7. *Claims 7-9, 13-15, and 27-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and the issues relating the 35 USC 101 rejections can be resolved. In this case the prior art of record does not explicitly disclose the specific sequence of steps relating to applying a specified fraction of the force and determining linkages deformed beyond a breaking point as a subset (claims 7 and 27), or determining additional forces to a difference in fluid pressure on opposite sides at the nodes (claims 13).*

Conclusion

8. *The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.*

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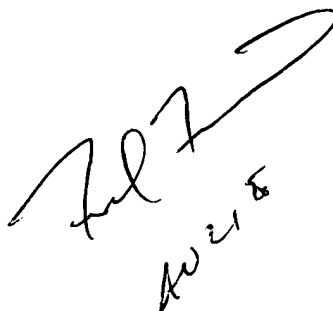
U.S. Patent 6,069,118 issued to Hinkel et al discloses a borehole liner and casing.

"The COMPANY: GeoCap", GeoCap Product Description, May 1998 discloses subsurface modeling and fault simulation.

"dGB++", Newsletter of dGB, February 2001 discloses subsurface modeling and fault simulation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 571-272-3778 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 571-272-3700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean Homere can be reached at 571-272-3780. The Official Fax Number is: (703) 872-9306

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